VOL10/NO3/SUMMER 2023

LEADER

INDUSTRIAL HYGIENE*

*the science of anticipating, recognizing, evaluating and controlling workplace conditions and illnesses

ENHANCING INDUSTRIAL HYGIENE with WEARABLE TECHNOLOGY

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In industry today, protecting the safety and health of front-line workers is of paramount importance. Industrial environments advance and evolve at a rapid pace, so do the potential risks and hazards that employees face on a daily basis. This is where industrial hygiene applies. Industrial hygiene refers to the science and art of understanding, identifying, evaluating, and controlling workplace conditions that may cause injury or illness to workers. It involves the assessment and management of various physical, chemical, biological, ergonomic, and psychosocial factors that can affect the health and safety of employees.

The use of technology to manage industrial hygiene functions is not new. Sensor based sampling instruments, lab analysis, and EHS analytics software have all been relied on for some time. However, the availability and advancements in wearable technology today offer significant opportunities to enhance our ability to keep industrial workers safe and ensure that industrial hygiene concerns are addressed. Wearables can be a game-changer as we evolve and manage safety differently.

> The World Health Organization (WHO) and International Labour Organization (ILO) Global Monitoring Report estimates that work-related diseases and injuries were responsible for the deaths of 1.9 million people in 2016. Globally, that's well over 5000 people a day. "These almost 2 million premature deaths are preventable. Action needs to be taken based on the research available to target the evolving nature of work-related health threats," said Dr. Maria Neira, Director of the Department of Environment, Climate Change and Health at WHO.

Prevention of Occupational Illnesses

Industrial hygiene plays a crucial role in preventing occupational illnesses, which can result from exposure to harmful substances such as chemicals, gases, and particulates. By identifying potential hazards and implementing effective control measures, industrial hygienists help reduce the likelihood of chronic diseases such as respiratory disorders, skin conditions, and even cancers that can stem from prolonged exposure.

Sensors and measurement devices are routinely utilized by hygienists to study suspected substances, or to conduct routine audits and surveys. Wearable technology now offers the ability to monitor facilities and work environments continually, while at the same time offering personalized insights as they are worn by an individual. This is a revolutionary approach compared to the traditional practices of periodic surveys, using a fixed position sensor, or what a wall mounted monitor would show (mostly, that the wall is safe!).

As those in industry know, the environmental conditions around a worker are often unique to the individual and ever changing. Two people within a few feet of each other may be experiencing dramatically different impacts based on which side of a machine they find themselves working. One may be experiencing poor air quality and high VOCs from exhaust, while the other may be receiving high noise dosage or elevated heat index.

Wearable technology available today can provide us with real-time notifications when conditions are approaching potentially dangerous levels, or alert us to a particular worker who is experiencing out of the ordinary exposure. In addition, the data gathered over time from an entire workforce can be studied. Data from people moving dynamically throughout a facility, overlaid onto a floor

plan, provides visual mapping that can be extraordinarily valuable. Unknowns may be revealed; things like pockets of air that are not moving in spite of air handling efforts, or certain compounds that are producing fumes that lead to high concentrations which were unforeseen.

Reduction of Workplace Injuries

Beyond addressing chemical and biological hazards, industrial hygiene also encompasses ergonomic factors that contribute to workplace injuries. Poor ergonomics, repetitive motions, and inadequate workstations can lead to musculoskeletal disorders (MSDs) like carpal tunnel syndrome and back or shoulder pain. By optimizing workspaces and promoting ergonomic practices, industrial hygiene minimizes the risk of these injuries, enhancing overall worker well-being.

It swiftly becomes impractical to ask workers to wear numerous devices, they're not trees to be decorated with ornaments! The right wearable tech doesn't have to be a choice between environmental monitoring and concern for potentially hazardous human movement. A robust and versatile wearable solution now can offer both and more. Understanding when risk is high for strain and exertion injuries, or data showing precursors to MSD's, is now easily possible. Having evidence that re-engineering a work process, or design change of an individual's workstation to alleviate repetitive movement, actually achieved the desired result (rather than hoping) can be at your fingertips in a dashboard.

Enhanced Productivity

A healthy workforce is a productive workforce. When employees feel safe and their health is prioritized, they are more likely to perform at their best. Industrial hygiene practices create an environment where workers can focus on their tasks without worrying about potential hazards, leading to increased efficiency and output.

Further, having optics into the environmental conditions a worker is operating in, as well as an understanding of the physicality or effort being expended to do work, provides context for understanding how productivity is being impacted and what adjustments may truly improve the worker experience and benefit productivity and efficiency.

Legal and Regulatory Compliance

Governments and regulatory bodies across the world have established strict guidelines and standards for workplace health and safety. Failing to adhere to these regulations can result in severe penalties and legal consequences. Industrial hygiene ensures that businesses stay compliant with these regulations, fostering a culture of responsibility and accountability.

I hope and look forward to regulatory agencies recognizing wearable safety tech, and viewing these tools as aids to prevention, similar to a traditional dosimeter button. Just envision having time and date stamped history of EHS readings for a site, and a roster of leading indicators that were flagged as significant by a leadership team, along with documentation of corrective actions taken to address the potential hazards and data evidence demonstrating that the risk was mitigated—that should be an inspectors delight.

Positive Organizational Culture

Investing in industrial hygiene showcases a company's commitment to the well-being of its employees. This commitment fosters a positive organizational culture built on trust, loyalty, and a sense of community. Workers who feel valued and cared for are more likely to be engaged and motivated, leading to reduced turnover rates and increased job satisfaction.

With the right approach, wearable safety tech can be very human-centric! Early on in our evolution designing a wearable solution, we philosophically made a decision to not deliver any feedback to the worker, no buzzers or bells or whistles, but rather passively gather data and deliver that intelligence to leaders to use. This created opportunities for engagement with their workers about what was important. It encouraged questions like, "Help me understand what you're experiencing, data shows something happening, the organization and I care and want to make sure we keep you safe." Those interactions are how culture is built.

There seem to be many offerings in the marketplace that simply buzz a worker when a device says there's a problem, and expect the worker knows

what to do to fix it. It should be easy to see how this can go wrong. A worker may not know exactly what to do to properly eliminate the risk, that's what safety professionals have been trained to know. The feedback may cause distraction or interruption, might create even more of a hazard, and likely becomes annoying in short order. Workers definitely know how to stop using or wearing something they think is an annoyance. And maybe most importantly, the worker may not be the problem that needs to be addressed. Targeting the worker automatically based on assumptions, and electronically delivering negative feedback to encourage behavior change is not the best remedy, and misses an opportunity—seeking to learn and understand so meaningful and long lasting change can result.

In addition to all the features and functionality mentioned above, we believed it important to facilitate front line worker communication of things like near misses, good catches, equipment needs or maintenance requests—by using the same wearable device. Something that is very unique in the wearables landscape is combining all discussed above with push-to-talk voice reporting from the front lines to leaders in real time. Over the years we're quite pleased that we've enabled communication of all sorts of potential hazards, and even quality concerns and process improvement suggestions from workers. This input from workers, everyone agrees, is tremendously valuable. It is certainly a desirable behavior change that can be encouraged, rewarded, and positively reinforced. This is the engagement and safety program participation leaders should strive to have and it's easily attainable, while

also maintaining concern for worker privacy issues and not tracking people or their biometrics or PII.

Risk Management

Industrial hygienists conduct thorough assessments to identify potential hazards, allowing companies to proactively mitigate risks. By implementing appropriate control measures, businesses can significantly reduce the likelihood of accidents and incidents, protecting both employees and the company's assets.

Periodic assessments may be required for some. However, the benefits of continual data and monitoring of the environmental conditions as well as ergonomics hopefully are illustrated above. This safety and risk intelligence can be delivered in real-time, and made actionable. This is an evolution from JHA/JSA's or studies that were done years ago and live in a binder on the shelf, to today's ability to see patterns, study data sets over time, and get real time notifications on trends happening now.

If we are endeavoring to truly understand what work on good days as well as bad days truly looks like, when workers are under pressure from organizations demands, how work in reality gets done and not just when someone with a clipboard is observing... wearable safety tech with the right approach can be a tool that helps deliver real results.

Conclusion

Industrial hygiene is not merely a regulatory obligation; it is a fundamental pillar of a responsible and sustainable business. Prioritizing worker health and safety through rigorous assessment and control of workplace hazards not only safeguards employees but also enhances overall organizational performance. As industries continue to evolve, embracing the principles of industrial hygiene will remain pivotal in creating a safer, healthier, and more productive work environment for everyone involved.

Industrial hygienists for years, I am often told, have contemplated the advantages that a multi sensor wearable device would offer... dreaming of the little black box that would one day contribute to their efforts. That day is now. And fear not, today's technology won't replace the need for safety pros, hygienists, and ergonomists, but in fact make it easier for them to do what they do well. But they can now enjoy immediate access to meaningful data with predictive value that fuels proactive and preventative decision making, to ensure effectiveness in keeping front line workers safe.

There are many different types of wearable technology offerings in the marketplace. Depending on how the term is defined, that may include everything from exoskeletons to remote lone worker emergency alerting. But wearable safety tech for the masses of front line workers in industrial settings is an even bigger use case. It is certainly advisable to think first about what problems you are trying to solve, but also what is required to implement a new solution with worker participation, how easy it is to pilot, and how success will be measured. Choosing a versatile solution that offers many immediately useful insights, and enables action without creating unnecessary work, from a provider that can be a partner who offers guidance and support, are critical. Access to true leading indicators of potential hazards and risk, easily, and cost effectively, has never been so within reach for EHS professionals.

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